

Initial Work Toward a Robotically Assisted EVA Glove

J. Rogers, B. Peters, E. McBryan, E. Laske
NASA Johnson Space Center, Houston, TX, 77058

The Space Suit RoboGlove is a device designed to provide additional grasp strength or endurance for an EVA crew member since gloved hand performance is a fraction of what the unencumbered human hand can achieve. There have been past efforts to approach this problem by employing novel materials and construction techniques to the glove design, as well as integrating powered assistance devices. This application of the NASA/GM RoboGlove technology uses a unique approach to integrate the robotic actuators and sensors into a Phase VI EVA glove. This design provides grasp augmentation to the glove user while active, but can also function as a normal glove when disabled. Care was taken to avoid adding excessive bulk to the glove or affecting tactility by choosing low-profile sensors and extrinsically locating the actuators. Conduits are used to guide robotic tendons from linear actuators, across the wrist, and to the fingers. The second generation of the SSRG includes updated electronics, sensors, and actuators to improve performance. The following discusses the electromechanical design, softgoods integration, and control system of the SSRG. It also presents test results from the first integration of a powered mobility element onto a space suit, the NASA Mark III. Early results show that sensor integration did not impact tactile feedback in the glove and the actuators show potential for reduction in grasp fatigue over time.